

CLAIMS

1. An apparatus for controlling operating features of a model train, comprising:
 - a plurality of selection devices each corresponding to a respective operating feature of said train;
 - a controller connected to said selection devices and operative to generate
 - 5 control signals corresponding to said selection devices;
 - a plurality of switches to control the form of said control signals; and
 - a transmitter connected to said controller operative to send said control signals to a receiver located on said train.
2. An apparatus in accordance with claim 1, wherein said plurality of selection devices are pushbuttons.
3. An apparatus in accordance with claim 1, wherein said controller is operative to create said digital messages using a frequency shift key method, and wherein said receiver is operative to decode said digital messages.
4. An apparatus in accordance with claim 3, wherein said transmitter is connected between said controller and a coupling capacitor, which in turn is connected to said track, and further wherein said transmitter transmits said digital messages to said track.
5. An apparatus in accordance with claim 1, wherein said controller is operative to monitor the voltage being applied to said track by way of a voltage sensor, and to then generate and transmit corresponding speed command signals to said receiver on said train.
6. An apparatus in accordance with claim 5 wherein said controller is operative to repeat said speed command signals to said receiver a predetermined number of times by using a queue technique.
7. An apparatus in accordance with claim 1, wherein said controller is operative to generate and apply conventional DC Offsets to said track.

8. An apparatus in accordance with claim 7, further comprising:
a first resistor connected to said controller, and a first transistor connected
between said first resistor and a first switching device; and
a second resistor connected to said controller, and a second transistor
5 connected between said second resistor and a second switching device;
wherein said first switching device, when actuated, connects a negative DC
offset supply to said tracks, and wherein said second switching device, when actuated,
connects a positive DC offset supply to said tracks.
9. An apparatus in accordance with claim 1 further comprising a switching
means for selecting between one of two of said trains that are operating on the same block of
said track or between a first and second train operating on separate blocks.
10. An apparatus in accordance with claim 9 wherein said switching means is
operative to actuate automatically thereby selecting one of said trains whose speed is altered.
11. A method of controlling operating features of a model train, comprising the
steps of:
providing a control box connected to a track on which at least one model train
is operating, wherein said control box has a plurality of selection devices therein, each
5 corresponding to a different operating feature on said train, and which are connected to a
controller;
producing a control signal by selecting a feature of said train by actuating one
or more of said selection devices; and
delivering said control signals to said train.
12. A method of controlling operating features of a model train in accordance with
claim 11 further including the step of selecting the form of said command signal.
13. A method of controlling operating features of a model train in accordance with
claim 11, wherein said step of producing a command signal includes generating a digital
message using a frequency shift key method.

14. A method of controlling operating features of a model train in accordance with claim 13, further comprising the step of transmitting said digital messages from said microprocessor to said track.

15. A method of controlling operating features of a model train in accordance with claim 14, further comprising the step of transmitting said digital messages from said controller to said train using RF means.

16. A method of controlling operating features of a model train in accordance with claim 11, wherein said step of producing a command signal includes generating a DC offset signal.

17. A system for controlling operating features of a model train, comprising:
a transformer operative to provide a voltage to a block of track for a model train;

5 a control box operative to allow for the selection and carrying out of operating features of said model train operating on said track, comprising:

(i) a plurality of selection devices each corresponding to a respective operating feature of said train;

(ii) a controller connected to said selection devices;

10 (iii) a transmitter connected between the output of said controller and said track, and operative to generate digital messages corresponding to said selection devices and to inject said digital messages onto said track;

(iii) a power supply connected to said controller and operative to provide suitable power to said controller; and

15 a receiver on said train operative to receive said digital messages generated by said digital signal generator.

18. A system in accordance with claim 17 further comprising:
a wireless receiver operative to receive signals generated and sent by a remote control;
a voltage sensor comprised of a DC offset detector and an AC voltage detector
5 connected between said transformer and said controller;
a zero-cross detector connected between the output of said power supply and the input of said controller;
wherein the combination of said voltage sensor and said zero-cross detector is operative to allow said controller to monitor the voltage being applied to said track and to
10 generate and transmit corresponding speed command signals to said receiver on said train.

19. A system in accordance with claim 18 wherein said AC voltage detector is a peak detector device.

20. A system in accordance with claim 18 wherein said controller is operative to repeat said speed command signals to said receiver a predetermined number of times by using a queue technique.

21. A system in accordance with claim 18 wherein said zero-cross detector is connected between the output of said transformer and the input of said controller.

22. A system in accordance with claim 17 further comprising a switching means for selecting between one of two of said trains that are operating on the same block of track or between a first and second train operating on separate blocks of track.

23. A system in accordance with claim 22 wherein said switching means is operative to actuate automatically to thereby select one said trains whose speed is altered.

24. A system in accordance with claim 17, wherein said plurality of selection devices are pushbuttons.

25. A system in accordance with claim 17, wherein said transmitter is operative to create said digital messages using a frequency shift key method; and wherein said receiver is operative to decode said digital messages.

26. A system in accordance with claim 18 wherein said zero-cross detector is connected between the input of said power supply and the input of said controller.

27. A method of controlling the speed of a model train comprising the steps of:
providing a model train configured to receive, process, and implement speed messages;

5 providing a control box suitable to read voltage and generate and send said speed messages corresponding to said read voltage to said train;

providing an AC waveform supplied to a block of track upon which said model train travels;

establishing a first reference point on said waveform;

10 sampling said AC waveform at a sampling point occurring after a pre-determined offset time interval following said reference point.

determining a speed message corresponding to said sampled voltage; and
sending said speed message to said model train.

28. The method of claim 27 wherein said step of establishing a reference point includes the step of detecting the zero-cross point in the waveform using a zero-cross detector.

29. The method of claim 27 wherein the step of determining a speed message further includes the substep of looking up said speed message corresponding to said sampled voltage in a look-up table.

30. The method of claim 27 wherein the step of determining a speed message further includes the substeps:

(i) setting a zero-movement threshold voltage;

5 (ii) processing said sampled voltage with said zero-movement threshold to determine said speed message.

31. The method of claim 27 where said step of sending said speed message further includes the step of repeating said speed message a predetermined number of times using a queue technique.